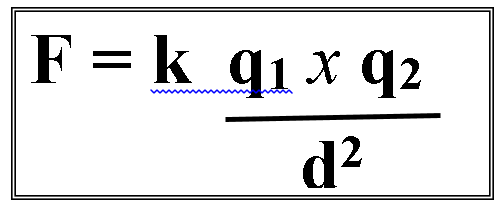
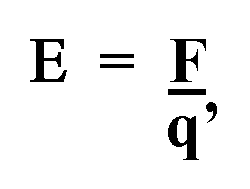
**Electrostatic Unit Formulas**

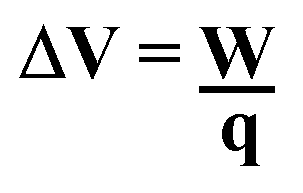
**** This is the original Coulomb’s equation that relates the force between two charges and the distance between them. “k” is Coulomb’s constant which is 9.0 x 10^9 N-m^2 per Coulomb squared.

sample problem to follow

**Question1** A negative charge of -2.0 x 10^-4 C and a positive charge of 8.0 x 10^ -4 C are separated by 0.30 meters. What is the force between the two charges?

****  
An electric field exists around any charged object. The field produces forces on other charged bodies.  
The electric field is the force per unit charge.  
Where E equals the electric field in Newtons per Coulomb (N/C)   
F equals the force in Newtons  
q’ equals the charge on the object

**Question 2** A negative charge of 1.4 x 10^-7 Coulombs experiences a force of 1.2 N. What is the electric field magnitude at this location?

Electric potential difference is the change in potential energy per unit of charge in an electric field.  
W equals the work in Joules needed to move a charge of “q” Coulombs   
Delta V is measured in volts.

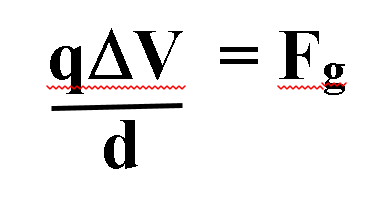
**Question 3** What is the magnitude of charge on a particle if 1.4 x 10^-3 J of work is needed to move the charge between two plates which are charged to 120 volts?

***V = Ed***

The electric field between two ***parallel plates*** is uniform between the plates, except near the edges. In a uniform field, the potential difference is related to the field strength by this equation.  
Delta V equals electric potential difference in volts.  
E equals the value of the electric field in Newtons/ Coulomb  
 d = the distance between the plates.

Charges move in a conductor until the electrical potential is the same everywhere on the conductor.  
Grounding makes the potential difference between an object and Earth equal to zero.

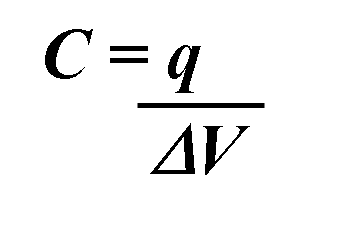
**Question 4** A constant electric field of 250 N/C is between a set of parallel plates that have a potential difference between them of 12.0 volts. How far apart are they?



This is the formula used by Millikan in his oil drop experiment to determine the charge on an electron.  
q is the charge in Coulombs, delta V is the voltage applied to the plates and F sub g is the force of gravity on the mass of the oil drop (it’s weight). “d’ is the distance between the plates.

**Question 5** In an oil drop experiment, a drop with a weight of 1.9 x 10^-14 N was suspended motionless. when the potential difference between the plates that were 63mm apart was 0.78 kV. What was the charge on the drop? How many electrons is this?

Capacitance is the ratio of the charge on an object to its electric potential difference. Capacitance is independent of the charge on an object and the electric potential across it.



Capacitors are used to store charge.  
C is the capacitance of a capacitor in Farads (named for Michael Faraday)

**This equation will not be tested on Thursday!**

Standard constants and numbers used in electrostatics:

Coulomb’s Constant “k” :

**9.0 x 109 N●m2/C2**

Number of electrons in one Coulomb:  
**6.24 x 1024 electrons**

Coulombs of charge on one electron:

**1.6 x 10-19 Coulombs**